Journal of MOLECULAR BIOLOGY

EDITOR-IN-CHIEF
J. C. KENDREW

ASSISTANT EDITOR
S. BRENNER

EDITORIAL BOARD
R. L. Baldwin
M. S. Bretscher
C. R. Cantor
J. Davies
G. A. Gilbert
M. Gottesman
R. Huber
A. Klug
D. E. Koshland
S. Lowey
V. Luzzati
M. F. Moody
D. Nathans
C. C. Richardson
P. M. B. Walker
J. C. Wang
K. Weber
S. M. Weissman

VOLUME 115
5 September to 5 October 1977

ACADEMIC PRESS
London New York San Francisco

Copyright © 1977, by Academic Press Inc. (London) Ltd.

ALL RIGHTS RESERVED

No part of this volume may be reproduced in any form, by photostat, microfilm, or any other means, without written permission from the publishers.

Printed in Great Britain

CONTENTS OF VOLUME 115

Number 1, 5 September 1977

Sternberg, M. J. E. and Thornton, J. M., On the Conformation of Proteins: Hydrophobic Ordering of Strands in β-Pleated Sheets 1

Hayatsu, H., Co-operative Mutagenic Actions of Bisulfite and Nitrogen Nucleophiles 19

Kiselev, N. A., Stel'mashchuk, V. Ya., Tsuprun, V. L., Ludewig, M. and Hanson, H., Electron Microscopy of Leucine Aminopeptidase . . . 33

Lica, L. and Ray, D. S., Replication of Bacteriophage M13. XII. *In vivo* Cross-linking of a Phage-specific DNA Binding Protein to the Single-stranded DNA of Bacteriophage M13 by Ultraviolet Irradiation 45

Ullrick, W. C., Toselli, P. A., Saide, J. D. and Phear, W. P. C., Fine Structure of the Vertebrate Z-Disc 61

Adetugbo, K. and Milstein, C., Spontaneous Missense Mutation of an Immunoglobulin in a Mouse Myeloma Cell Line 75

Letters to the Editor

Giege, R., Moras, D. and Thierry, J. C., Yeast Transfer RNA^{Asp}: A New High-resolution X-ray Diffracting Crystal Form of a Transfer RNA 91

Gehring, H., Christen, P., Eichele, G., Glor, M., Jansonius, J. N., Reimer, A.-S., Smit, J. D. G. and Thaller, C., Isolation, Crystallization and Preliminary Crystallographic Data of Aspartate Aminotransferase from Chicken Heart Mitochondria 97

Jurnak, F., Miller, D. and Rich, A., Preliminary X-ray Diffraction Data for Tetragonal Crystals of Trypsinized *Escherichia coli* Elongation Factor 103

Number 2, 15 September 1977

Ross, P. D., Hofrichter, J. and Eaton, W. A., Thermodynamics of Gelation of Sickle Cell Deoxyhemoglobin 111

Chou, P. Y. and Fasman, G. D., β-Turns in Proteins 135

Dufton, M. J. and Hider, R. C., Snake Toxin Secondary Structure Predictions: Structure Activity Relationships 177

Turner, C. L. and Huber, R. E., Differential Binding of Allolactose Anomers to the Lactose Repressor of *Escherichia coli* 195

Kowalczykowski, S. and Steinhardt, J., Kinetics of Hemoglobin S Gelation Followed by Continuously Sensitive Low-shear Viscosity: Changes in Viscosity and Volume on Aggregation 201

Condit, R. C., Cowie, A., Kamen, R. and Birg, F., Polyoma Virus Transcription *in vitro* 215

Letters to the Editor

Flavell, A. J. and Kamen, R., Strand-specific Transcription of Polyoma Virus DNA Late during Productive Infection 237

Thusius, D., Does a Functional Relationship Exist between the Polymerization and Catalytic Activity of Beef Liver Glutamate Dehydrogenase? 243

Zain, B. S. and Roberts, R. J., A New Specific Endonuclease from *Xanthomonas badrii* 249

Klarman, A. and Daniel, E., Built-in Co-operativity of Oxygen Binding by Arthropod Hemocyanins 257

Number 3, 25 September 1977

Baker, E. N., Structure of Actinidin: Details of the Polypeptide Chain Conformation and Active Site from an Electron Density Map at 2·8 Å Resolution 263

Jacobson, A. B. and Spahr, P. F., Studies on the Secondary Structure of Single-stranded RNA from the Bacteriophage MS2. II. Analysis of the RNase IV Cleavage Products 279

Louarn, J., Patte, J. and Louarn, J.-M., Evidence for a Fixed Termination Site of Chromosome Replication in *Escherichia coli* K12 295

Warner, J. R., In the Absence of Ribosomal RNA Synthesis, the Ribosomal Proteins of HeLa Cells are Synthesized Normally and Degraded Rapidly 315

Gausing, K., Regulation of Ribosome Production in *Escherichia coli*: Synthesis and Stability of Ribosomal RNA and of Ribosomal Protein Messenger RNA at Different Growth Rates 335

McFarland, J. T., Chen, J., Wnuk, M., DeTraglia, M. C., Li, T. Y., Petersen, R., Jacobs, J. W., Schmidt, J., Feinberg, B. and Watters, K. L., Subunit Interactions in Liver Alcohol Dehydrogenase: A Partial Alkylation Study 355

Longley, W., A New Crystalline Form of Tropomyosin 381

CANTRELL, M. and CRAVEN, G. R., Chemical Inactivation of *Escherichia coli* 30 S Ribosomes with Maleic Anhydride: Identification of the Proteins Involved in Polyuridylic Acid Binding 389

SAITOH, T. and ISHIHAMA, A., Biosynthesis of RNA Polymerase in *Escherichia coli*. VI. Distribution of RNA Polymerase Subunits between Nucleoid and Cytoplasm. 403

BULLARD, B., HAMMOND, K. S. and LUKE, B. M., The Site of Paramyosin in Insect Flight Muscle and the Presence of an Unidentified Protein between Myosin Filaments and Z-line 417

CHRISTIANSEN, C. and BALDWIN, R. L., Catalysis of DNA Reassociation by the *Escherichia coli* DNA Binding Protein: A Polyamine-dependent Reaction 441

YU, L. C., LYMN, R. W. and PODOLSKY, R. J., Characterization of a Non-indexible Equatorial X-ray Reflection from Frog Sartorius Muscle 455

CARLSSON, L., NYSTRÖM, L.-E., SUNDKVIST, I., MARKEY, F. and LINDBERG, U., Actin Polymerizability is Influenced by Profilin, a Low Molecular Weight Protein in Non-muscle Cells 465

STIMAC, E., HOUSMAN, D. and HUBERMAN, J. A., Effects of Inhibition of Protein Synthesis on DNA Replication in Cultured Mammalian Cells 485

SPILLMANN, S., DOHME, F. and NIERHAUS, K. H., Assembly *in vitro* of the 50 S Subunit from *Escherichia coli* Ribosomes: Proteins Essential for the First Heat-dependent Conformational Change 513

VOVIS, G. F. and LACKS, S., Complementry Action of Restriction Enzymes Endo R·*Dpn* I and Endo R·*Dpn* II on Bacteriophage f1 DNA . . . 525

SZABO, P., ELDER, R., STEFFENSEN, D. M. and UHLENBECK, O. C., Quantitative *in situ* Hybridization of Ribosomal RNA Species to Polytene Chromosomes of *Drosophila melanogaster* 539

LETTER TO THE EDITOR

ZINGSHEIM, H. P., GEISLER, N., MAYER, F. and WEBER, K., Complexes of *Escherichia coli lac*-Repressor with Non-operator DNA Revealed by Electron Microscopy: Two Repressor Molecules Can Share the Same Segment of DNA 565

NUMBER 4, 5 OCTOBER 1977

ROBERTSON, H. D., DICKSON, E. and JELINEK, W., Determination of Nucleotide Sequences from Double-stranded Regions of HeLa Cell Nuclear RNA . 571

JELINEK, W. R., Specific Nucleotide Sequences in HeLa Cells Inverted Repeated DNA: Enrichment for Sequences Found in Double-stranded Regions of Heterogeneous Nuclear RNA 591

Dennis, P. P., Transcription Patterns of Adjacent Segments on the Chromosome of *Escherichia coli* Containing Genes Coding for Four 50 S Ribosomal Proteins and the β and β' Subunits of RNA Polymerase 603

Appendix: The Competition of Radioactive RNA Sequences from RNA–DNA Hybrids by Competitor DNA Sequences: A Model System Illustrating the Hybridization and Competition of 23 S Ribosomal RNA Sequences with 23 S Ribosomal DNA 621

Arnone, A., Benesch, R. E. and Benesch, R., Structure of Human Deoxyhemoglobin Specifically Modified with Pyridoxal Compounds 627

Penningroth, S. M. and Kirschner, M. W., Nucleotide Binding and Phosphorylation in Microtubule Assembly *in vitro* 643

Perlman, P. S., Douglas, M. G., Strausberg, R. L. and Butow, R. A., Localization of Genes for Variant Forms of Mitochondrial Proteins on Mitochondrial DNA of *Saccharomyces cerevisiae* 675

Schibler, U., Kelley, D. E. and Perry, R. P., Comparison of Methylated Sequences in Messenger RNA and Heterogeneous Nuclear RNA from Mouse L Cells 695

Flavell, R. A., Van den Berg, F. M. and Grosveld, G. C., Isolation and Characterization of the Oligo(dA–dT) Clusters and their Flanking DNA Segments in the Rabbit Genome 715

Appendix: Jeffreys, A. J., Flavell, R. A. and Van den Berg, F. M., Theoretical Analysis of (dA–dT) Cluster Distributions in DNA . . 735

Levine, B. A., Mercola, Dan, Thornton, J. M. and Coffman, D., Calcium Binding by Troponin-C. A Proton Magnetic Resonance Study . . . 743

Index to Volume 115

Actin polymerizability is influenced by profilin, a low molecular weight protein in non-muscle cells, 465
Actinidin structure: details of the polypeptide chain conformation and active site from an electron density map at 2·8 Å resolution, 263
Adetugbo, K. & Milstein, C., Spontaneous missense mutation of an immunoglobulin in a mouse myeloma cell line, 75
Allolactose anomers, differential binding to the lactose repressor of *Escherichia coli*, 195
Anomers, allolactose, differential binding to the lactose repressor of *Escherichia coli*, 195
Arnone, A., Benesch, R. E. & Benesch, R., Structure of human deoxyhemoglobin specifically modified with pyridoxal compounds, 627
Arthropod hemocyanins, built-in co-operativity of oxygen binding, 257
Aspartate aminotransferase from chicken heart mitochondria, isolation, crystallization and preliminary crystallographic data, 97
Assembly *in vitro* of the 50 S subunit from *Escherichia coli* ribosomes: proteins essential for the first heat-dependent conformational change, 513
— of microtubules *in vitro*, nucleotide binding and phosphorylation, 643

Bacteriophage f1 DNA, complementary action of restriction enzymes endo R·*Dpn* I and endo R·*Dpn* II, 525
— M13 replication: *in vivo* cross-linking of a phage-specific DNA binding protein to the single-stranded DNA of bacteriophage M13 by ultraviolet irradiation, 45
— MS2, studies on the secondary structure of single-stranded RNA; analysis of the RNase IV cleavage products, 279
Baker, E. N., Structure of actinidin: details of the polypeptide chain conformation and active site from an electron density map at 2·8 Å resolution, 263
Baldwin, R. L. (see also Christiansen, C.), 441
Beef liver glutamate dehydrogenase, does a functional relationship exist between polymerization and catalytic activity?, 243
Benesch, R. (see also Arnone, A.), 627
Benesch, R. E. (see also Arnone, A.), 627
β and β' subunits of RNA polymerase and four 50 S ribosomal proteins, transcription patterns of adjacent segments on the chromosome of *Escherichia coli* containing their coding genes, 603
β-pleated sheets, hydrophobic ordering of strands; on the conformation of proteins, 1
β-turns in proteins, 135
Binding, differential, of allolactose anomers to the lactose repressor of *Escherichia coli*, 195
—, nucleotide, and phosphorylation in microtubule assembly *in vitro*, 643
—, of calcium by troponin-C; a proton magnetic resonance study, 743
—, oxygen, by arthropod hemocyanins, built-in co-operativity, 257
Biosynthesis of RNA polymerase in *Escherichia coli*: distribution of RNA polymerase subunits between nucleoid and cytoplasm, 403
Birg, F. (see also Condit, R. C.), 215
Bisulfite and nitrogen nucleophiles, co-operative mutagenic actions, 19
Bullard, B., Hammond, K. S. & Luke, B. M., The site of paramyosin in insect flight muscle and the presence of an unidentified protein between myosin filaments and Z-line, 417
Butow, R. A. (see also Perlman, P. S.), 675

Calcium binding by troponin-C; a proton magnetic resonance study, 743
Cantrell, M. & Craven, G. R., Chemical inactivation of *Escherichia coli* 30 S ribosomes with maleic anhydride: indentification of the proteins involved in polyuridylic acid binding, 389
Carlsson, L., Nyström, L.-E., Sundkvist, I., Markey, F. & Lindberg, U., Actin polymerizability is influenced by profilin, a low molecular weight protein in non-muscle cells, 465
Catalysis of DNA reassociation by the *Escherichia coli* DNA binding protein: a polyamine- dependent reaction, 441
Catalytic activity and polymerization of beef liver glutamate dehydrogenase, does a functional relationship exist between them?, 243

Chemical inactivation of *Escherichia coli* 30 S ribosomes with maleic anhydride: indentification of the proteins involved in polyuridylic acid binding, 389
Chen, J. (see also McFarland, J. T.), 355
Chicken heart mitochondria, isolation, crystallization and preliminary crystallographic data of aspartate aminotransferase, 97
Chou, P. Y. & Fasman, G. D., β-turns in proteins, 135
Christen, P. (see also Gehring, H.), 97
Christiansen, C. & Baldwin, R. L., Catalysis of DNA reassociation by the *Escherichia coli* DNA binding protein: a polyamine-dependent reaction, 441
Chromosome of *Escherichia coli*, transcription patterns of adjacent segments containing genes coding for four 50 S ribosomal proteins and the β and β' subunits of RNA polymerase, 603
Chromosomes, polytene, of *Drosophila melanogaster*, quantitative *in situ* hybirdization of ribosomal RNA species, 539
Chromosome replication in *Escherichia coli* K12, evidence for a fixed termination site, 295
Clusters, oligo(dA-dT), and their flanking DNA segments in the rabbit genome, isolation and characterization, 715
Coffman, D. (see also Levine, B. A.), 743
Competition of radioactive RNA sequences from RNA–DNA hybrids by competitor DNA sequences: a model system illustrating the hybridization and competition of 23 S ribosomal RNA sequences with 23 S ribosomal DNA, 621
Condit, R. C., Cowie, A., Kamen, R. & Birg, F., Polyoma virus transcription *in vitro*, 215
Conformation of proteins: hydrophobic ordering of strands in β-pleated sheets, 1
Co-operative mutagenic actions of bisulfite and nitrogen nucleophiles, 19
Co-operativity, built-in, of oxygen binding by arthropod hemocyanins, 257
Cowie, A. (see also Condit, R. C.), 215
Craven, G. R. (see also Cantrell, M.), 389
Cross-linking *in vivo* of a phage-specific DNA binding protein to the single-stranded DNA of bacteriophage M13 by ultraviolet irradiation, 45
Crystalline form, new, of tropomyosin, 381
Crystallographic data, preliminary, isolation and crystallization of aspartate aminotransferase from chicken heart mitochondria, 97

(dA-dT) cluster distributions in DNA, theoretical analysis, 735
Daniel, E. (see also Klarman, A.), 257
Dennis, P. P., Transcription patterns of adjacent segments on the chromosome of *Escherichia coli* containing genes coding for four 50 S ribosomal proteins and the β and β' subunits of RNA polymerase, 603
Deoxyhemoglobin, human, specifically modified with pyridoxal compounds, structure, 627
—, sickle cell, gelation thermodynamics, 111
DNA of bacteriophage f1, complementary action of restriction enzymes endo R·*Dpn* I and endo R·*Dpn* II, 525
—, HeLa cell inverted repeated, specific nucleotide sequences: enrichment for sequences found in double-stranded regions of heterogeneous nuclear RNA, 591
—, isolation and characterization on the oligo(dA–dT) clusters and their flanking segments in the rabbit genome, 715
—, mitochondrial, of *Saccharomyces cerevisiae*, localization of genes for variant forms of mitochondrial proteins, 675
—, non-operator, complexes with *Escherichia coli lac*-repressor revealed by electron microscopy: two repressor molecules can share the same segment of DNA, 565
— of polyoma virus, strand-specific transcription late during productive infection, 237
— reassociation, catalysis by the *Escherichia coli* DNA binding protein: a polyamine-dependent reaction, 441
— replication in cultured mammalian cells, the effects of inhibition of protein synthesis, 485
— sequences, competition with radioactive RNA sequences from RNA-DNA hybrids: a model system illustrating the hybridization and competition of 23 S ribosomal RNA sequences with 23 S ribosomal DNA, 621
—, single-stranded, of bacteriophage M13, *in vivo* cross-linking of a phage-specific DNA binding protein by ultraviolet irradiation, 45
—, theoretical analysis of (dA-dT) cluster distributions, 735
Detraglia, M. C. (see also McFarland, J. T.), 355
Dickson, E. (see also Robertson, H. D.), 571
Dohme, F. (see also Spillmann, S.), 513
Douglas, M. G. (see also Perlman, P. S.), 675

Drosophila melanogaster, quantitative *in situ* hybridization of ribosomal RNA species to polytene chromosomes, 539
Dufton, M. J. & Hider, R. C., Snake toxin secondary structure predictions: structure activity relationships, 177

Eaton, W. A. (see also Ross, P. D.), 111
Eichele, G. (see also Gehring, H.), 97
Elder, R. (see also Szabo, P.), 539
Electron microscopy of leucine aminopeptidase, 33
— — reveals complexes of *Escherichia coli lac*-repressor with non-operator DNA: two repressor molecules can share the same segment of DNA, 565
Elongation factor of *Escherichia coli*, trypsinized, preliminary X-ray diffraction data for tetragonal crystals, 103
Endo R·*Dpn* I and endo R·*Dpn* II, restriction enzymes, complementary action on bacteriophage f1 DNA, 525
Endonuclease, specific, new, from *Xanthomonas badrii*, 249
Equatorial X-ray reflection, non-indexible, from frog sartorius muscle, 455
Escherichia coli, assembly *in vitro* of the 50 S ribosomal subunit: proteins essential for the first heat-dependent conformational change, 513
— —, biosynthesis of RNA polymerase; distribution of RNA polymerase subunits between nucleoid and cytoplasm, 403
— — chromosome, transcription patterns of adjacent segments containing genes coding for four 50 S ribosomal proteins and the β and β' subunits of RNA polymerase, 603
— —, differential binding of allolactose anomers to the lactose repressor, 195
— — DNA binding protein catalyses DNA reassociation; a polyamine-dependent reaction, 441
— — elongation factor, trypsinized, preliminary X-ray diffraction data for tetragonal crystals, 103
— — K12, evidence for a fixed termination site of chromosome replication, 295
— — *lac*-repressor, complexes with non-operator DNA revealed by electron microscopy: two repressor molecules can share the same segment of DNA, 565
— —, regulation of ribosome production: synthesis and stability of ribosomal RNA and of ribosomal protein mRNA at different growth rates, 335
— — 30 S ribosomes, chemical inactivation with maleic anhydride; identification of the proteins involved in polyuridylic acid binding, 389

f1 (see also Bacteriophage), 525
Fasman, G. D. (see also Chou, P. Y.), 135
Feinberg, B. (see also McFarland, J. T.), 355
Flavell, A. J. & Kamen, R., Strand-specific transcription of polyoma virus DNA late during productive infection, 237
Flavell, R. A., Van den Berg, F. M. & Grosveld, G. C., Isolation and characterization of the oligo(dA-dT) clusters and their flanking DNA segments in the rabbit genome, 715
—. (see also Jeffreys, A. J.), 735
Frog sartorius muscle, characterization of a non-indexible equatorial X-ray reflection, 455

Gausing, K., Regulation of ribosome production in *Escherichia coli*: synthesis and stability of ribosomal RNA and of ribosomal protein mRNA at different growth rates, 335
Gehring, H., Christen, P., Eichele, G., Glor, M., Jansonius, J. N., Reimer, A.-S., Smit, J. D. G. & Thaller, C., Isolation, crystallization and preliminary crystallographic data of aspartate aminotransferase from chicken heart mitochondria, 97
Geisler, N. (see also Zingsheim, H. P.), 565
Gelation of hemoglobin S followed by continuously sensitive low-shear viscosity; changes in viscosity and volume on aggregation, 201
— thermodynamics of sickle cell deoxyhemoglobin, 111
Gene localization for variant forms of mitochondrial proteins on mitochondrial DNA of *Saccharomyces cerevisiae*, 675
Genome, rabbit, isolation and characterization of the oligo(dA–dT) clusters and their flanking DNA segments, 715
Giege, R., Moras, D. & Thierry, J. C., Yeast transfer RNA^{Asp}: a new high-resolution X-ray diffracting crystal form of a transfer RNA, 91
Glor, M. (see also Gehring, H.), 97
Glutamate dehydrogenase of beef liver, Does a functional relationship exist between the polymerization and catalytic activity?, 243

Grosveld, G. C. (see also Flavell, R. A.), 715
GTP role in microtubule assembly, 643

Hammond, K. S. (see also Bullard, B.), 417
Hanson, H. (see also Kiselev, N. A.), 33
Hayatsu, H., Co-operative mutagenic actions of bisulfite and nitrogen nucleophiles, 19
Heart mitochondria of chicken, isolation, crystallization and preliminary crystallographic data of aspartate aminotransferase, 97
HeLa cell inverted repeated DNA, specific nucleotide sequences: enrichment for sequences found in double-stranded regions of heterogeneous nuclear RNA, 591
— — nuclear RNA, determination of nucleotide sequences from double-stranded regions, 571
— cells: in the absence of ribosomal RNA synthesis the ribosomal proteins are synthesized normally and degraded rapidly, 315
Hemocyanins of arthropods, built-in co-operativity of oxygen binding, 257
Hemoglobin S gelation followed by continuously sensitive low-shear viscosity; changes in viscosity and volume on aggregation, 201
Hider, R. C. (see also Dufton, M. J.), 177
Hofrichter, J. (see also Ross, P. D.), 111
Housman, D. (see also Stimac, E.), 485
Huber, R. E. (see also Turner, C. L.), 195
Hubermann, J. A. (see also Stimac, E.), 485
Human deoxyhemoglobin specifically modified with pyridoxal compounds, structure, 627
Hybridization and competition of 23 S ribosomal RNA sequence with 23 S ribosomal DNA, an illustrative model system, 621
—, quantitative, *in situ*, of ribosomal RNA species to polytene chromosomes of *Drosophila melanogaster*, 539
Hydrophobic ordering of strands in β-pleated sheets; on the conformation of proteins, 1

Immunoglobulin spontaneous missense mutation in a mouse myeloma cell line, 75
Insect flight muscle, the site of paramyosin and the presence of an unidentified protein between myosin filaments and Z-line, 417
Ishihama, A. (see also Saitoh, T.), 403

Jacobs, J. W. (see also McFarland, J. T.), 355
Jacobson, A. B. & Spahr, P. F., Studies on the secondary structure of single-stranded RNA from the bacteriophage MS2. II. Analysis of the RNase IV cleavage products, 279
Jansonius, J. N. (see also Gehring, H.), 97
Jeffreys, A. J., Flavell, R. A. & Van den Berg, F. M., Theoretical analysis of (dA-dT) cluster distributions in DNA (*Appendix* to Flavell, R. A., *et al.*, 715), 735
Jelinek, W. R., Specific nucleotide sequences in HeLa cells inverted repeated DNA: enrichment for sequences found in double-stranded regions of heterogeneous nuclear RNA, 591
— (see also Robertson, H. D.), 571
Jurnak, F., Miller, D. & Rich, A., Preliminary X-ray diffraction data for tetragonal crystals of trypsinized *Escherichia coli* elongation factor, 103

Kamen, R. (see also Condit, R. C.), 215
— (see also Flavell, A. J.), 237
Kelley, D. E. (see also Schibler, U.), 695
Kinetics of hemoglobin S gelation followed by continuously sensitive low-shear viscosity; changes in viscosity and volume on aggregation, 201
Kirschner, M. W. (see also Penningroth, S. M.), 643
Kiselev, N. A., Stel'mashchuk, V. Ya., Tsuprun, V. L., Ludewig, M. & Hanson, H., Electron microscopy of leucine aminopeptidase, 33
Klarman, A. & Daniel, E., Built-in co-operativity of oxygen binding by arthropod hemocyanins, 257
Kowalczykowski, S. & Steinhardt, J., Kinetics of hemoglobin S gelation followed by continuously sensitive low-shear viscosity: changes in viscosity and volume on aggregation, 201

Lacks, S. (see also Vovis, G. F.), 525
lac-repressor of *Escherichia coli*, complexes with non-operator DNA revealed by electron microscopy: two repressor molecules can share the same segment of DNA, 565

Lactose repressor of *Escherichia coli*. differential binding of allolactose anomers, 195
Leucine aminopeptidase, electron microscopy, 33
Levine, B. A., Mercola, Dan, Thornton, J. M. & Coffman, D., Calcium binding by troponin-C. A proton magnetic resonance study, 743
Li, T. Y. (see also McFarland, J. T.), 355
Lica, L. & Ray, D. S., Replication of bacteriophage M13. XII. *In vivo* cross-linking of a phage-specific DNA binding protein to the single-stranded DNA of bacteriophage M13 by ultraviolet irradiation, 45
Lindberg, U. (see also Carlsson, L.), 465
Liver alchol dehydrogenase subunit interactions; a partial alkylation study, 355
—, beef, glutamate dehydrogenase, does a functional relationship exist between the polymerization and catalytic activity?, 243
Longley, W., A new crystalline form of tropomyosin, 381
Louarn, J., Patte, J. & Louarn, J.-M., Evidence for a fixed termination site of chromosome replication in *Escherichia coli* K12, 295
— (see also Louarn, J.), 295
Ludewig, M. (see also Kiselev, N. A.), 33
Luke, B. M. (see also Bullard, B.), 417
Lymn, R. W. (see also Yu, L. C.), 455

M13 (see also Bacteriophage), 45
MS2 (see also Bacteriophage), 279
McFarland, J. T., Chen, J., Wnuk, M., Detraglia, M. C., Li, T. Y., Petersen, R., Jacobs, J. W., Schmidt, J., Feinberg, B. & Watters, K. L., Subunit interactions in liver alcohol dehydrogenase: a partial alkylation study, 355
Maleic anhydride inactivation of *Escherichia coli* 30 S ribosomes; identification of the proteins involved in polyuridylic acid binding, 389
Mammalian cells, cultured, effects of inhibition of protein synthesis on DNA replication, 485
Markey, F. (see also Carlsson, L.), 465
Mayer, F. (see also Zingsheim, H. P.), 565
Mercola, Dan (see also Levine, B. A.), 743
Messenger RNA and heterogeneous nuclear RNA from mouse L cells, comparison of methylated sequences, 695
— — of ribosomal protein, and ribosomal RNA, their synthesis and stability at different growth rates in *Escherichia coli*. 335
Methylated sequences, comparison in mRNA and heterogeneous nuclear RNA from mouse L cells, 695
Microtubule assembly *in vitro*, nucleotide binding and phosphorylation, 643
Miller, D. (see also Jurnak, F.), 103
Milstein, C. (see also Adetugbo, K.), 75
Missense mutation, spontaneous, of an immunoglobulin in a mouse myeloma cell line, 75
Mitochondria of chicken heart, isolation, crystallization and preliminary crystallographic date of aspartate aminotransferase, 97
Mitochondrial proteins, variant forms, localization of genes on mitochondrial DNA of *Saccharomyces cerevisiae*, 675
Moras, D. (see also Giege, R.), 91
Mouse L cells, comparsion of methylated sequences in mRNA and heterogeneous nuclear RNA, 695
— myeloma cell line, spontaneous missense mutation of an immunoglobulin, 75
Muscle, insect flight, the site of paramyosin and the presence of an unidentified protein between myosin filaments and Z-line, 417
—, sartorius, of frog, characterization of a non-indexible equatorial reflection, 455
Mutagenic actions, co-operative, of bisulfite and nitrogen nucleophiles, 19
Mutation, missense, spontaneous, of an immunoglobulin in a mouse myeloma cell line, 75
Myeloma cell line of mouse, spontaneous missense mutation of an immunoglobulin, 75

Nierhaus, K. H. (see also Spillmann, S.), 513
Nitrogen nucleophiles and bisulfite, co-operative mutagenic actions, 19
Nuclear RNA, HeLa cell, determination of nucleotide sequences from double-stranded regions, 571
— —, heterogeneous, enrichment for sequences found in double-stranded regions; specific nucleotide sequences in HeLa cell inverted repeated DNA, 591

— —, —, and mRNA, from mouse L cells, comparison of methylated sequences, 695
Nyström, L.-E. (see also Carlsson, L.), 465

Oligo(dA-dT) clusters and their flanking DNA segments in the rabbit genome, isolation and characterization, 715
Oxygen binding by arthropod hemocyanins, built-in co-operativity, 257

Paramyosin site in insect flight muscle and the presence of an unidentified protein between myosin filaments and Z-line, 417
Patte, J. (see also Louarn, J.), 295
Penningroth, S. M. & Kirschner, M. W., Nucleotide binding and phosphorylation in microtubule assembly *in vitro*, 643
Perlman, P. S., Douglas, M. G., Strausberg, R. L. & Butow, R. A., Localization of genes for variant forms of mitochondrial proteins on mitochondrial DNA of *Saccharomyces cerevisiae*, 675
Perry, R. P. (see also Schibler, U.), 695
Petersen, R. (see also McFarland, J. T.), 355
Phear, W. P. C. (see also Ullrick, W. C.), 61
Phosphorylation and nucleotide binding in microtubule assembly *in vitro*, 643
Podolsky, R. J. (see also Yu, L. C.), 455
Polyamine-dependent reaction: catalysis of DNA reassociation by the *Escherichia coli* DNA binding protein, 441
Polymerase for RNA, biosynthesis in *Escherichia coli*: distribution of RNA polymerase subunits between nucleoid and cytoplasm, 403
Polymerization and catalytic activity of beef liver glutamate dehydrogenase, does a functional relationship exist between them?, 243
Polyoma virus DNA, strand-specific transcription late during productive infection, 237
— virus transcription *in vitro*, 215
Polytene chromosomes of *Drosophila melanogaster*, quantitative *in situ* hybridization of ribosomal RNA species, 539
Polyuridylic acid binding, identification of the 30 S proteins involved; chemical inactivation of *Escherichia coli* 30 S ribosomes, 389
Profilin, a low molecular weight protein in non-muscle cells, influences actin polymerizability, 465
Protein β-turns, 135
— conformation: hydrophobic ordering of strands in β-pleated sheets, 1
—, DNA binding, of *Escherichia coli*, catalyses DNA reassociation; a polyamine-dependent reaction, 441
—, mitochondrial, localization of genes for variant forms on mitochondrial DNA of *Saccharomyces cerevisiae*, 675
— mRNA, ribosomal, and ribosomal RNA, their synthesis and stability at different growth rates in *Escherichia coli*, 335
—, phage-specific DNA binding, cross-linked *in vivo* by ultraviolet irradiation to the single-stranded DNA of bacteriophage M13, 45
— synthesis, effects of its inhibition on DNA replication in cultured mammalian cells, 485
—, unidentified, between myosin filaments and Z-line, and the site of paramyosin in insect flight muscle, 417
Proteins essential for the first heat-dependent conformational change in the assembly *in vitro* of the 50 S subunit from *Escherichia coli* ribosomes, 513
— involved in polyuridylic acid binding; chemical inactivation of *Escherichia coli* 30 S ribosomes with maleic anhydride, 389
—, ribosomal, of HeLa cells are synthesized normally and degraded rapidly in the absence of ribosomal RNA synthesis, 315
—, 50 S ribosomal, four, and the β and β' subunits of RNA polymerase, transcription patterns of adjacent segments on the chromosome of *Escherichia coli* containing their coding genes, 603
Proton magnetic resonance study of calcium binding by troponin-C, 743
Pyridoxylated human deoxyhemoglobin structure, 627

Rabbit genome, isolation and characterization of the oligo(dA-dT) clusters and their flanking DNA segments, 715
Ray, D. S. (see also Lica, L.), 45
Reimer, A.-S. (see also Gehring, H.), 97

Replication of bacteriophage M13: *in vivo* cross-linking of a phage-specific DNA binding protein to the single-stranded DNA of bacteriophage M13 by ultraviolet irradiation, 45
— — chromosomes in *Escherichia coli* K12, evidence for a fixed termination site, 295
— — DNA in cultured mammalian cells, the effects of inhibition of protein synthesis, 485
Repressor, lactose, of *Escherichia coli*, differential binding of allolactose anomers, 195
Restriction enzymes endo R·*Dpn* I and endo R·*Dpn* II, complementary action on bacteriophage f1 DNA, 525
RNA, messenger, and heterogeneous nuclear RNA, from mouse L cells, comparison of methylated sequences, 695
—, nuclear, HeLa cell, determination of nucleotide sequences from double-stranded regions, 571
— —, heterogeneous, enrichment for sequences found in double-stranded regions; specific nucleotide sequences in HeLa cell inverted repeated DNA, 591
— polymerase β and β' subunits and four 50 S ribosomal proteins, transcription patterns of adjacent segments on the chromosome of *Escherichia coli* containing their coding genes, 603
— — biosynthesis in *Escherichia coli*: distribution of RNA polymerase subunits between nucleoid and cytoplasm, 403
—, ribosomal, and ribosomal protein mRNA, their synthesis and stability at different growth rates in *Escherichia coli*, 335
— —, synthesis: in its absence the ribosomal proteins of HeLa cells are synthesized normally and degraded rapidly, 315
— sequences, radioactive, from RNA–DNA hybrids, competition by competitor DNA sequences: a model system illustrating the hybridization and competition of 23 S ribosomal RNA sequences with 23 S ribosomal DNA, 621
—, single-stranded, from the bacteriophage MS2, studies on the secondary structure; analysis of the RNase IV cleavage products, 279
— species, ribosomal, quantitative *in situ* hybridization to polytene chromosomes of *Drospohila melanogaster*, 539
—, yeast $tRNA^{Asp}$, a new high-resolution X-ray diffracting crystal form of a transfer RNA, 91
Ribosomal RNA species, quantitative *in situ* hybridization to polytene chromosomes of *Drosophila melanogaster*, 539
— — synthesis: in its absence the ribosomal proteins of HeLa cells are synthesized normally and degraded rapidly, 315
— 50 S proteins, four, and the β and β' subunits of RNA polymerase, transcription patterns of adjacent segments on the chromosome of *Escherichia coli* containing their coding genes, 603
— 50 S subunits of *Escherichia coli*, assembly *in vitro*: proteins essential for the first heat-dependent conformational change, 513
Ribosome production regulation in *Escherichia coli*: synthesis and stability of ribosomal RNA and of ribosomal protein mRNA at different growth rates, 335
Ribosomes 30 S of *Escherichia coli*, their chemical inactivation with maleic anhydride; identification of the proteins involved in polyuridylic acid binding, 389
Rich, A. (see also Jurnak, F.), 103
Roberts, R. J. (see also Zain, B. S.), 249
Robertson, H. D., Dickson, E. & Jelinek, W., Determination of nucleotide sequences from double-stranded regions of HeLa cell nuclear RNA, 571
Ross, P. D., Hofrichter, J. & Eaton, W. A., Thermodynamics of gelation of sickle cell deoxyhemoglobin, 111

Saccharomyces cerevisiae, localization of genes for variant forms of mitochondrial proteins on mitochondrial DNA, 675
Saide, J. D. (see also Ullrick, W. C.), 61
Saitoh, T. & Ishihama, A., Biosynthesis of RNA polymerase in *Escherichia coli*. VI. Distribution of RNA polymerase subunits between nucleoid and cytoplasm, 403
Sartorius muscle of frog, characterization of a non-indexible equatorial X-ray reflection, 455
Schibler, U., Kelley, D. E. & Perry, R. P., Comparison of methylated sequences in mRNA and heterogeneous nuclear RNA from mouse L cells, 695
Schmidt, J. (see also McFarland, J. T.), 355
Secondary structure predictions for snake toxins; structure activity relationships, 177
— — of single-stranded RNA from the bacteriophage MS2: analysis of the RNase IV cleavage products, 279
Sequences, methylated, comparison in mRNA and heterogeneous nuclear RNA from mouse L cells, 695
—, nucleotide, from double-stranded regions of HeLa cell nuclear RNA, 571

—, —, specific, in HeLa cell inverted repeated DNA: enrichment for sequences found in double-stranded regions of heterogeneous nuclear RNA, 591
Sickle cell deoxyhemoglobin gelation thermodynamics, 111
Smit, J. D. G. (see also Gehring, H.), 97
Snake toxin secondary structure predictions; structure activity relationships, 177
Spahr, P. F. (see also Jacobson, A. B.), 279
Spillmann, S., Dohme, F. & Nierhaus, K. H., Assembly *in vitro* of the 50 S subunit from *Escherichia coli* ribosomes: proteins essential for the first heat-dependent conformational change, 513
Steffensen, D. M. (see also Szabo, P.), 539
Steinhardt, J. (see also Kowalczykowski, S.), 201
Stel'mashchuk, V. Ya. (see also Kiselev, N. A.), 33
Sternberg, M. J. E. & Thornton, J. M., On the conformation of proteins: hydrophobic ordering of strands in β-pleated sheets, 1
Stimac, E., Housman, D. & Huberman, J. A., Effects of inhibition of protein synthesis on DNA replication in cultured mammalian cells, 485
Strands, hydrophobic ordering in β-pleated sheets; on the conformation of proteins, 1
Strand-specific transcription of polyoma virus DNA late during productive infection, 237
Strausberg, R. L. (see also Perlman, P. S.), 675
Structure of actinidin: details of the polypeptide chain conformation and active site from an electron density map at 2·8 Å resolution, 263
—, fine, of the vertebrate Z-disc, 61
— of human deoxyhemoglobin specifically modified with pyridoxal compounds, 627
—, secondary, of single-stranded RNA from the bacteriophage MS2: analysis of the RNase IV cleavage products, 279
—, —, predictions for snake toxins; structure activity relationships, 177
Subunit interactions in liver alcohol dehydrogenase; a partial alkylation study, 355
Sundkvist, I. (see also Carlson, L.), 465
Synthesis and stability of ribosomal RNA and of ribosomal protein mRNA at different growth rates in *Escherichia coli*, 335
— of protein, effects of its inhibition on DNA replication in cultured mammalian cells, 485
— — ribosomal proteins and the transcription of ribosomal precursor RNA, 315
Szabo, P., Elder, R., Steffensen, D. M. & Uhlenbeck, O. C., Quantitative *in situ* hybridization of ribosomal RNA species to polytene chromosomes of *Drosophila melanogaster*, 539

Termination site, fixed, of chromosome replication in *Escherichia coli*, K12, 295
Thaller, C. (see also Gehring, H.), 97
Thermodynamics of gelation of sickle cell deoxyhemoglobin, 111
Thierry, J. C. (see also Giege, R.), 91
Thornton, J. M. (see also Levine, B. A.), 743
Thornton, J. M. (see also Sternberg, M. J. E.), 1
Thusius, D., Does a functional relationship exist between the polymerization and catalytic activity of beef liver glutamate dehydrogenase?, 243
Toselli, P. A. (see also Ullrick, W. C.), 61
Toxins of snake venom, secondary structure predictions; structure activity relationships, 177
Transcription for polyoma virus *in vitro*, 215
— patterns of adjacent segments on the chromosome of *Escherichia coli* containing genes coding for four 50 S ribosomal proteins and the β and β′ subunits of RNA polymerase, 603
—, strand-specific, of polyoma virus DNA late during productive infection, 237
Transfer RNA^{Asp} of yeast: a new high-resolution X-ray diffracting crystal form of a transfer RNA, 91
Tropomyosin, a new crystalline form, 381
Troponin-C calcium binding; a proton magnetic resonance study, 743
Trypsinized *Escherichia coli* elongation factor tetragonal crystals, preliminary X-ray diffraction data, 103
Tsuprun, V. L. (see also Kiselev, N. A.), 33
Turner, C. L. & Huber, R. E., Differential binding of allolactose anomers to the lactose repressor of *Escherichia coli*, 195

Uhlenbeck, O. C. (see also Szabo, P.), 539
Ullrick, W. C., Toselli, P. A., Saide, J. D. & Phear, W. P. C., Fine structure of the vertebrate Z-disc, 61

Ultraviolet irradiation induces *in vivo* cross-linking of a phage-specific DNA binding protein to the single-stranded DNA of bacteriophage M13, 45

Van den Berg, F. M. (see also Flavell, R. A.), 715
Van den Berg, F. M. (see also Jeffreys, A. J.), 735
Variant forms of mitochondrial proteins, localization of genes on mitochondrial DNA of *Saccharomyces cerevisiae*, 675
Vertebrate Z-disc fine structure, 61
Virus, polyoma, strand-specific transcription of DNA late during productive infection, 237
—, polyoma, transcription *in vitro*, 215
Viscosity measurements for hemoglobin S gelation, 201
Vovis, G. F. & Lacks, S., Complementary action of restriction enzymes endo R·*Dpn* I and endo R·*Dpn* II on bacteriophage f1 DNA, 525

Warner, J. R., In the absence of ribosomal RNA synthesis, the ribosomal proteins of HeLa cells are synthesized normally and degraded rapidly, 315
Watters, K. L. (see also McFarland, J. T.), 355
Weber, K. (see also Zingsheim, H. P.), 565
Wnuk, M. (see also McFarland, J. T.), 355

Xanthomonas badrii, a new specific endonuclease, 249
X-ray diffracting crystal form, high-resolution, of yeast $tRNA^{Asp}$, 91
— diffraction data, preliminary, for tetragonal crystals of trypsinized *Escherichia coli* elongation factor, 103
— non-indexible equatorial reflection from frog sartorius muscle, 455

Yeast transfer RNA^{Asp}: a new high-resolution X-ray diffracting crystal form of a transfer RNA, 91
Yu, L. C., Lymn, R. W. & Podolsky, R. J., Characterization of a non-indexible equatorial X-ray reflection from frog sartorius muscle, 455

Zain, B. S. & Roberts, R. J., A new specific endonuclease from *Xanthomonas badrii*, 249
Z-disc, vertebrate, fine structure, 61
Zingsheim, H. P., Geisler, N., Mayer, F. & Weber, K., Complexes of *Escherichia coli lac*-repressor with non-operator DNA reavealed by electron microscopy: two repressor molecules can share the same segment of DNA, 565